What Is Claimed Is:

1. A vane pump comprising:

a) a pump housing having a cylindrical interior chamber defining a central axis through which a vertical centerline and a horizontal centerline extend;

b) a cam member disposed within the interior chamber of the pump housing and having a bore extending therethrough and defining a circumferential surface of a pumping cavity, the circumferential surface of the pumping cavity including a discharge arc segment, an inlet arc segment and seal arc segments separating the inlet arc segment and the discharge arc segment from one another;

c) a cylindrical rotor member mounted for rotational movement within the bore of the cam member about an axis aligned with the central axis of the interior chamber, the rotor member having a central body portion which includes a plurality of circumferentially spaced apart radially extending vane slots formed therein, each vane slot supporting a corresponding vane element mounted for radial movement therein, each vane element having a radially outer tip surface adapted for slideably engaging the circumferential surface of the pumping cavity and a radially inner undervane portion within each vane slot; and

d) a chamber defined within the housing and positioned for fluid communication with the undervane portion of each vane element and providing a desired pressure thereto, the chamber being in fluid communication with a first pressure source and a second pressure source, wherein the first pressure source is associated with the discharge arc segment of the pumping cavity, and the second pressure source is associated with the inlet arc segment of the pumping cavity.

2. A vane pump as recited in Claim 1, wherein the pump is a variable displacement vane pump and the cam member is mounted for pivotal movement within

the interior chamber of the pump housing about a fulcrum aligned with the vertical centerline of the interior chamber.

3. A vane pump as recited in Claim 1, wherein the pump is a fixed displacement vane pump and the cam member is mounted with the pump housing and having a fixed relation with respect to the central axis.

4. A vane pump as recited in Claim 1, wherein the circumferential surface of the pump cavity includes a discharge arc segment of about 150 degrees, a first seal arc segment of about 30 degrees, an inlet arc segment of about 150 degrees and a second seal arc segment of about 30 degrees.

5. A vane pump as recited in Claim 1, wherein the first and second pressure sources are in fluid communication with the chamber each by way of a restrictor, each restrictor dimensioned and configured to limit an amount of fluid communicated to the chamber from the first and second pressure sources respectively, thereby creating a desired pressure within the chamber.

6. A vane pump as recited in Claim 5, wherein the chamber is in fluid communication with the undervane portion of each vane element when each vane element passes through the seal arc segments as the rotor member rotates about the central axis.

7. A vane pump as recited in Claim 6, wherein each restrictor is dimensioned and configured to provide a pressure equal to about one half of a pressure communicated thereto by the first or second pressure sources.

8. A vane pump as recited in Claim 5, wherein each restrictor includes valve means for selectively controlling the volume of fluid communicated to the chamber by the first and second pressure sources respectively, resulting in the desired pressure within the chamber.

9. A vane pump as recited in Claim 8, wherein the desired pressure is communicated to the undervane portion of each vane element when each vane element passes through the seal arc segment as the rotor member rotates about the central axis.

10. A vane pump as recited in Claim 1, further comprising first and second axially spaced apart end plates disposed within the interior chamber of the pump housing, each end plate having a first surface which is adjacent to the rotor member, each first surface forming an axial end portion of the pumping cavity, each end plate spaced from the rotor member so as to allow frictionless rotation of the rotor member within the pumping cavity.

11. A vane pump as recited in Claim 10, wherein the first and second pressure sources are in fluid communication with the chamber each by way of a restrictor, each restrictor dimensioned and configured to limit an amount of fluid communicated to the chamber from the first and second pressure sources respectively, thereby creating a desired pressure within the chamber.

12. A vane pump as recited in Claim 11, wherein the first surface of the first end plate has the chamber and each restrictor formed therein.

13. A vane pump as recited in Claim 10, wherein first and second channels are formed in the first surface of each end plate, the first channel being configured to provide

a path for fluid to communicate from the first pressure source to the restrictor, and the second channel being configured to provide a path for fluid to flow from the second pressure source to the restrictor.

14. A vane pump as recited in Claim 13, wherein the rotor member further comprises a plurality of substantially axial fluid passages machined in the central body portion of the rotor, each passage positioned between the plurality of circumferentially spaced apart radial vane slots and providing a path for fluid to flow axially from the pumping cavity to the first and second end plate.

15. A vane pump comprising:

a) a pump housing having a cylindrical interior chamber defining a central axis through which a vertical centerline and a horizontal centerline extend;

b) a cam member disposed within the interior chamber of the pump housing and having a bore extending therethrough and defining a circumferential surface of a pumping cavity, the circumferential surface of the pumping cavity including a discharge arc segment, an inlet arc segment and seal arc segments separating the inlet arc segment and the discharge arc segment from one another;

c) a cylindrical rotor member mounted for rotational movement within the bore of the cam member about an axis aligned with the central axis of the interior chamber, the rotor member having a central body portion which includes a plurality of circumferentially spaced apart radially extending vane slots formed therein, each vane slot supporting a corresponding vane element mounted for radial movement therein, each vane element having a radially outer tip surface adapted for slideably engaging the circumferential surface of the pumping cavity and a radially inner undervane portion within each vane slot; and

d) means for providing a pressure to the undervane portions of the vane elements when each vane element rotates through the seal arc segments, the pressure comprising a first pressure supplied from a source within the discharge arc segment of the pumping cavity and a second pressure supplied from a source within the inlet arc segment of the pumping cavity.

16. A vane pump as recited in Claim 15, wherein the pump is a variable displacement vane pump and the cam member is mounted for pivotal movement within the interior chamber of the pump housing about a fulcrum aligned with the vertical centerline of the interior chamber.

17. A vane pump as recited in Claim 15, wherein the pump is a fixed displacement vane pump and the cam member is mounted with the pump housing and having a fixed relation with respect to the central axis.

18. A vane pump as recited in Claim 15, wherein the circumferential portion of the pump cavity includes a discharge arc segment of about 150 degrees, a first seal arc segment of about 30 degrees, an inlet arc segment of about 150 degrees and a second seal arc segment of about 30 degrees.

19. A vane pump as recited in Claim 15, wherein the means for providing a pressure to the undervane portions of the vane elements comprises a chamber in fluid communication with the first and second pressure sources.

20. A vane pump as recited in Claim 19, wherein the first and second pressure sources are in fluid communication with the chamber each by way of a restrictor, each restrictor dimensioned and configured to limit an amount of fluid communicated to the

chamber from the first and second pressure sources respectively, thereby creating a desired pressure within the chamber.

21. A vane pump as recited in Claim 20, wherein the chamber is in fluid communication with the undervane portion of each vane element when each vane element passes through the seal arc segments as the rotor member rotates about the central axis.

22. A vane pump as recited in Claim 21, wherein each restrictor is dimensioned to provide a pressure equal to 1/2 of a pressure communicated thereto.

23. A vane pump as recited in Claim 20, wherein each restrictor includes valve means for selectively controlling the volume of fluid communicated to the chamber by the first and second pressure sources respectively, resulting in the desired pressure within the chamber.

24. A vane pump as recited in Claim 23, wherein the desired pressure is communicated to the undervane portion of each vane element when each vane element passes through the seal arc segment as the rotor member rotates about the central axis.

25. A vane pump as recited in Claim 15, further comprising first and second axially spaced apart end plates disposed within the interior chamber of the pump housing, each end plate having a first surface which is adjacent to the rotor member, each first surface forming an axial end portion of the pumping cavity, each end plate spaced from the rotor member so as to allow frictionless rotation of the rotor member within the pumping cavity.

26. A vane pump as recited in Claim 25, wherein the first and second pressure sources are in fluid communication with the chamber each by way of a restrictor, each restrictor dimensioned and configured to limit an amount of fluid communicated to the chamber from the first and second pressure sources respectively, thereby creating a desired pressure within the chamber.

27. A vane pump as recited in Claim 26, wherein the first surface of the first end plate has the chamber and each restrictor formed therein.

28. A vane pump as recited in Claim 27, wherein first and second channels are formed in the first surface of each end plate, the first channel being configured to provide a path for fluid to communicate from the first pressure source to the restrictor, and the second channel being configured to provide a path for fluid to communicate from the second pressure source to the restrictor.

29. A vane pump as recited in Claim 25, wherein the rotor member further comprises a plurality of substantially axial fluid passages machined in the central body portion of the rotor, each passage positioned between the plurality of circumferentially spaced apart radial vane slots and providing a path for fluid to communicate axially from the pumping cavity to the first and second end plate.

30. A vane pump comprising:

a) a pump housing having a cylindrical interior chamber defining a central axis through which a vertical centerline and a horizontal centerline extend;

b) a cam member disposed within the interior chamber of the pump housing and having a bore extending therethrough and defining a circumferential surface of a pumping cavity, the circumferential surface of the pumping cavity including a

discharge arc segment, an inlet arc segment and seal arc segments separating the inlet arc segment and the discharge arc segment from one another;

c) a cylindrical rotor member mounted for rotational movement within the bore of the cam member about an axis aligned with the central axis of the interior chamber, the rotor member having a central body portion which includes a plurality of circumferentially spaced apart radially extending vane slots formed therein, each vane slot supporting a corresponding vane element mounted for radial movement therein, each vane element having a radially outer tip surface adapted for slideably engaging the circumferential surface of the pumping cavity and a radially inner undervane portion within each vane slot;

d) first and second axially spaced apart end plates disposed within the interior chamber of the pump housing, each end plate having a first surface which is adjacent to the rotor member, each first surface forming an axial end portion of the pumping cavity, each end plate spaced from the rotor member so as to allow frictionless rotation of the rotor member within the pumping cavity; and

e) a first pressure chamber formed in the first surface of the first end plate and a second pressure chamber formed in the first surface of the second end plate, each pressure chamber positioned for fluid communication with the undervane portion of each vane element and providing a desired pressure thereto, each pressure chamber being in fluid communication with a first pressure source and a second pressure source, wherein the first pressure source is associated with the discharge arc segment of the pumping cavity, and the second pressure source is associated with the inlet arc segment of the pumping cavity.

31. A vane pump as recited in Claim 30, wherein the pump is a variable displacement vane pump and the cam member is mounted for pivotal movement within

the interior chamber of the pump housing about a fulcrum aligned with the vertical centerline of the interior chamber.

32. A vane pump as recited in Claim 30, wherein the pump is a fixed displacement vane pump and the cam member is mounted with the pump housing and having a fixed relation with respect to the central axis.

33. A vane pump as recited in Claim 30, wherein the first and second pressure sources communicates with the first pressure chamber each by way of a restrictor, each restrictor dimensioned and configured to limit an amount of fluid communicated to the first pressure chamber from the first and second pressure sources respectively, thereby creating a desired pressure within the first pressure chamber.

34. A vane pump as recited in Claim 33, wherein the first and second pressure sources communicates with the second pressure chamber each by way of a restrictor, each restrictor dimensioned and configured to limit an amount of fluid communicated to the second pressure chamber from the first and second pressure sources respectively, thereby creating the desired pressure within the second pressure chamber.

35. A vane pump as recited in Claim 30, wherein the first and second pressure chambers are in fluid communication with the undervane portion of each vane element when each vane element passes through the seal arc segments as the rotor member rotates about the central axis.

36. A vane pump as recited in Claim 34, wherein each restrictor is dimensioned to provide a pressure equal to 1/2 of a pressure communicated thereto.

37. A vane pump as recited in Claim 34, wherein each restrictor includes valve means for selectively controlling the volume of fluid communicated passing therethrough, resulting in the desired pressure within the first and second pressure chambers.

38. A vane pump as recited in Claim 30, wherein first and second channels are formed in the first surface of each end plate, the first channel being configured to provide a path for fluid to communicate from the first pressure source to the restrictor, and the second channel being configured to provide a path for fluid to communicate from the second pressure source to the restrictor.

39. A vane pump as recited in Claim 30, wherein the rotor member further comprises a plurality of substantially axial fluid passages machined in the central body portion of the rotor, each passage positioned between the plurality of circumferentially spaced apart radial vane slots and providing a path for fluid to communicate axially from the pumping cavity to the first and second end plates.